

Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1-29 (cancelled).

30. (new) A valve for controlling flow of a primary fluid in a primary flow channel which comprises

a) a valve fluid channel;

b) a membrane of a porous dielectric material located in the valve fluid channel so as to divide the valve fluid channel into an inlet part and an outlet part and so that valve fluid flowing between the inlet and outlet parts flows through the said membrane;

c) first and second electrodes located for electrical communication with valve fluid in the inlet and outlet parts respectively of the valve fluid channel for application of an electric potential across the membrane in order to promote electro-osmotic flow of valve fluid through the membrane;

d) the outlet part of the valve fluid channel being located at least partially within the primary flow channel, at least part of the wall of the outlet part of the valve fluid channel comprising a valve member being a tubular part for expandable diaphragm sleeve, the tubular diaphragm sleeve can be displaced between open and closed positions as a result of valve fluid moving in the valve fluid channel through the membrane into or out of the outlet part of the valve fluid channel so that an increase in fluid pressure in the outlet part of the valve fluid channel causes the tubular diaphragm to expand transversely relate to the valve fluid channel towards the wall of the primary flow channel to cause a reduction in the capacity for flow of the primary fluid in the primary flow channel when it is in the closed position compared with when it is in the open position.

31. (new) A valve as claimed in claim 30 further comprising a latching valve to control flow of the valve fluid in the valve fluid channel.

32. (new) A valve as claimed in claim 31 wherein the latching valve is a shuttle valve.

33. (new) A valve as claimed in claim 32 wherein the shuttle valve comprises a shuttle valve member adapted to slide within a shuttle valve member housing to control fluid flow through the housing between input and output ports in the housing.

34. (new) A valve as claimed claim 30, wherein the diaphragm is a resiliently deformable material.

35. (new) A valve as claimed in claim 30, wherein the inlet part of the valve fluid channel comprises a resiliently expandable reservoir.

36. (new) A valve for controlling flow of a primary fluid in a primary flow channel which comprises

- a) a valve fluid channel;
- b) a membrane of a porous dielectric material located in the channel so as to divide the channel into an inlet part and an outlet part and so that the valve fluid flowing between the inlet and outlet parts flows through the said membrane;
- c) first and second electrodes located for electrical communication with valve fluid in the inlet and outlet parts respectively of the valve fluid channel for application of an electric potential across the membrane in order to promote electro-osmotic flow of valve fluid through the membrane;
- d) a valve member which can be displaced between open and closed positions as a result of valve fluid moving in the valve fluid channel through the membrane, into or out of the outlet part of the valve fluid channel, in which the valve member causes a reduction in the capacity for flow of the primary fluid in the primary flow channel when it is in the closed position compared with when it is in the open position; the valve member comprising a compressible tube which forms part of the primary flow channel, the compressible tube being located within a chamber which is in fluid communication with the outlet part of the valve fluid channel so that an increase

in fluid pressure in the said chamber as a result of flow of valve fluid into the outlet part of the valve fluid channel can cause compression of the compressible tube, to reduce the flow of the primary fluid through the compressible tube.

37. (new) A valve as claimed in claim 36, wherein the compressible tube is compressed circumferentially by the valve fluid.

38. (new) A valve for controlling flow of a primary fluid in a primary flow channel which comprises:

- a) a valve fluid channel;
- b) a membrane of a porous dielectric material located in the channel so as to divide the channel into an inlet part and an outlet part and so that valve fluid flowing between the inlet and outlet parts flows through the said membrane;
- c) first and second electrodes located for electrical communication with valve fluid in the inlet and outlet parts respectively of the valve fluid channel for application of an electric potential across the membrane in order to promote electro-osmotic flow of valve fluid through the membrane;
- d) a valve member which can be displaced between open and closed positions as a result of valve fluid moving in the valve fluid channel through the membrane, into or out of the outlet part of the valve fluid channel, in which the valve member causes a reduction in the capacity for flow of the primary fluid in the primary flow channel when it is in the closed position compared with when it is in the open position;
- e) a valve member housing in which the valve member can move between the said open and closed positions; the valve member housing having a first end towards which the valve member moves when moving towards its open position from its closed position and an opposite second end towards which the valve member moves when moving towards its closed position from its open position, and in which the valve member housing has a first opening at or towards the first end thereof which communicates with the inlet part of the valve fluid channel and a second opening at or towards the second end thereof which communicates with the outlet part of the valve fluid channel.

39. (new) A pump for controlling flow of a primary fluid in a primary flow channel which comprises

- a) a driver valve comprising:
 - i) a valve fluid channel;
 - ii) a membrane of a porous dielectric material located in the channel so as to divide the channel into an inlet part and an outlet part and so that the valve fluid flowing between the inlet and outlet parts flows through the said membrane;
 - iii) first and second electrodes located for electrical communication with valve fluid in the inlet and outlet parts respectively of the valve fluid channel for application of an electric potential across the membrane in order to promote electro-osmotic flow of valve fluid through the membrane;
 - iv) a valve member which can be displaced between open and closed positions as a result of valve fluid moving in the valve fluid channel through the membrane, into or out of the outlet part of the valve fluid channel, in which the valve member causes a reduction in the volume of the primary flow channel when it is in the closed position compared with when it is in the open position;
- b) an inlet valve located upstream of the driver valve for controlling flow of primary fluid into the primary flow channel when it is acted on by the driver valve; and
- c) an outlet valve located downstream of the driver valve for controlling release of primary fluid from the primary flow channel when it is acted on by the driver valve; the pump further comprising a latching valve to control flow of the valve fluid in the valve fluid channel.

40. (new) A pump as claimed in claim 39, wherein the latching valve comprises a latching valve member housing towards which a latching valve member moves when moving towards its open position from its closed position and an opposite second end towards which the latching valve member moves when moving towards its closed position from its open position, and in which the latching valve member housing comprises a first opening at or towards the first end thereof which communicates with an inlet part of a second valve fluid channel and a second

opening at or towards the second end thereof which communicates with an outlet part of the second valve fluid channel.

41. (new) A pump as claimed in claim 40, wherein the inlet and outlet parts of the second fluid channel are separated by a membrane comprising a porous dielectric material.

42. (new) A pump as claimed in claim 41, further comprising third and fourth electrodes located for electrical communication with the valve fluid in the inlet and outlet parts of the second valve fluid channel respectively for application of an electric potential across the membrane in order to promote electro-osmotic flow of valve fluid through the membrane.

43. (new) A pump for controlling flow of a primary fluid in a primary flow channel, which comprises

- a) a driver valve comprising:
 - i) a valve fluid channel;
 - ii) a membrane of a porous dielectric material located in the channel so as to divide the channel into an inlet part and an outlet part and so that the valve fluid flowing between the inlet and outlet parts flows through the said membrane;
 - iii) first and second electrodes located for electrical communication with valve fluid in the inlet and outlet parts respectively of the valve fluid channel for application of an electric potential across the membrane in order to promote electro-osmotic flow of valve fluid through the membrane;
 - iv) a valve member which can be displaced between open and closed positions as a result of valve fluid moving in the valve fluid channel through the membrane, into or out of the outlet part of the valve fluid channel, in which the valve member causes a reduction in the volume of the primary flow channel when it is in the closed position compared with when it is in the open position;
- b) an inlet valve located upstream of the driver valve for controlling flow of primary flow into the primary flow channel when it is acted on by the driver valve; and

c) an outlet valve located downstream of the driver valve for controlling release of primary fluid from the primary flow channel when it is acted on by the driver valve the valve member comprising a compressible tube which forms part of the primary flow channel, the compressible tube being located within a chamber which is the fluid communication within the outlet part of the valve fluid, channel such that an increase in fluid pressure in the said chamber as a result of flow of valve fluid into the outlet part of the valve fluid channel can cause compression of the compressible tube to reduce the flow of the primary fluid through the compressible tube.

44. (new) A pump as claimed in claim 43, wherein the compressible tube is compressed circumferentially by the valve fluid.